NORTHERN TIER INTEROPERABILITY PROJECT

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Project Newsletter

Hello! This is the first edition of the Northern Tier Interoperability Consortium (NTIC) newsletter. This newsletter is being published by the NTIC Board as a means to to keep you informed about the latest developments on the radio project. As the project moves forward, there will be a lot of information to share. Some of it will include:

- Keeping you up-to-date on how the project is going
- Let you know about scheduled meetings where you'll have a chance to participate in the design and implementation.
- Provide you with some information on the technology behind the new system
- Publish some educational articles on the various components
- Have a question and answer section where you can ask about anything you'd like to see more information on

Project Update

The NTIC Board held it's monthly meeting on January 6th, 2005 at the Great Northern in Havre. At that meeting, they made the decision to adopt a design consistent and compatible with the Lewis & Clark County. This was an important milestone, as it sets the direction for the project. The Board also received an overview of the Lewis & Clark County system from Sheriff Cheryl Liedle. The Sheriff provided information on funding, how the system meets the needs of Lewis & Clark County and how it's positioned for expansion.

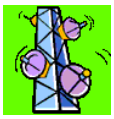
The Contract Negotiations Team has been formed. The purpose of this team is to review all contracts throughout the project and make recommendations to the NTIC Board. Where necessary, this team will also conduct contract negotiations on behalf of the NTIC Consortium. The team consists of members of the consortium, the project manager, and legal council.

The Technical Team has been formed. The purpose of this team is to oversee the technical components of the project. They'll work closely with the vendor community to ensure the design, implementation and testing of the system is both technically sound and meets the requirements of the NTIC. The team consists of members from the consortium, the project manger, Montana Highway Patrol, FBI, and the System Administrator for Lewis & Clark County.

NORTHROP GRUMMAN
DEFINING THE FUTURE

Project Update (Continued)

The Technical Team team met to discuss coverage requirements, and will be working to assist Motorola in preparing propagation maps for the Northern Tier. These maps predict the radio coverage at 95% reliability and are critical in determining site selection.



Immediately after the sites have been selected, the Technical Team will focus on the microwave design. The requirements will be assembled and presented to the microwave vendors to prepare design and cost information.

Coming soon will be the formation of the Business Business Practice Review. This team will answer the question "What's the best way to operate using the new system, in order to take the maximum advantage of it's features". This is a critical component of the system, and will lay the foundation for interoperable communications within the Northern Tier.

Upcoming Events

2/3/05 - Monthly NTIC Board Meeting, Havre MT

2/3/05 - 2/4/05 - Technical Team Design Meeting, Havre MT

2/8/05 - 2/9/05 - Border Patrol Meeting, Sweetgrass Port of Entry MT

2/23-05 - National Park Service Radio Meeting, West Glacier MT

3/3/05 - Monthly NTIC Board Meeting, Havre MT

To Be Scheduled - Business Practice Review Team

To Be Scheduled - Contract Negotiation Team

Radio Definitions

As the radio project moves forward, you'll begin to notice a new vocabulary blending into the discussion. Some of these are terms you've heard for years, but some of them are new. To help out, here's a glossary of some of the more common terms you'll be hearing.

Analog
Whenever a person speaks, sound is projected in the form of a sound wave. These waves move at a certain frequency that determines the pitch of the sound. An analog radio network transmits the actual wave of a person's voice over the air by modulating it onto a radio frequency carrier. An analog network operates differently from a digital network, which converts the vocal sound wave into a digital bit stream of ones and zeros. This information is then sent over the air, and eventually converted back into an analog wave to be heard.

APCO
This stands for The Association of Public Safety Communications Officials. This agency is composed of many different public safety employees and representatives from around the world. APCO was one of the lead agencies in the development of the Project 25 Standard on which our new radio system is based.

Backward Compatibility
This term refers to the capability of a piece of equipment (i.e. software program, hardware component) to be compatible with its predecessor in all forms. For instance, Microsoft Word 2000 is backward compatible since it can create documents that will run in Microsoft Word '97.

Base Station
This term refers to a stationary radio connected to an antenna. The antenna is located where it can transmit into and receive from a geographic area where mobile and portable radios are being operated.

Common Air Interface (CAI)
This refers to the protocol by which handheld and mobile radios communicate with the radio system infrastructure. In modern radio systems this is typically a proprietary format, however the CAI, defined by the Project 25 Standard, makes this an open protocol. This allows different manufacturers' portable and mobile radios to work together on a single radio system.

Console
A console is used by a dispatch operator to communicate with users in the field, to track radio activity, and to coordinate the efforts of various public safety agencies. A typical dispatch position consists of various types of equipment, which along with the radio console includes several different tracking and communication systems, usually running on anywhere from one to five computers. Dispatchers usually operate in a public safety facility, with consoles set up in their individual work areas.

Conventional
A conventional radio network allocates specific frequencies to specific groups of radio users permanently. If nobody in a particular group is transmitting on their assigned frequency, then that channel remains open. This is in contrast to a trunking network which assigns frequencies to users only when they are needed, which can be more efficient. The NTIC network will be a combination of conventional and trunking network.

Coverage/Coverage Area
A radio network's coverage area refers to the entire area that gets a strong enough signal from the network for a radio in the field to transmit and receive. Once a signal from a network degrades so badly that it is essentially useless, and all transmissions are bad or impossible, then that area is considered to be out of the coverage area. The coverage area is often called the "footprint" of a network.

Digital
The term "digital" refers to the method of expressing information in one of two different electronic states, which are usually designated as ones or zeros. These ones and zeros form a pattern that can be translated into all kinds of information. Relaying digital information through an electrical system is done by transmitting electronic pulses with one of two distinct electrical charges. These pulses are usually referred to as either "1" or "0", with the "1" pulse usually having a higher voltage, or charge, than the "0" pulse. Electronic equipment such as computers can interpret the information by: a) receiving a set of electronic pulses, b) sensing the different voltages of the pulses, therefore determining whether each pulse is a "1" or a "0", and c) combining many of these ones and zeros to form instructions that tell the computer what to do.

Encryption
Digital transmissions can use encryption to secure information that is being transmitted. The reason this security technique is so effective is because the encrypted transmissions can only be deciphered by a radio with the proper decryption key. This key consists of a software application that is programmed into the authorized radios. With the new network, digital encryption can be incorporated as part of the system as needed.

FCC
This stands for the Federal Communications Commission. This governmental agency decides how frequencies are to be used, as well as who can transmit on them. The FCC sets aside specific amounts of frequencies for public safety transmissions, commercial wireless carriers, television broadcasts, etc. Traditionally, the FCC grants blocks of frequencies to public safety agencies, while commercial carriers must buy a license to transmit from the FCC.

Frequency
All radio networks broadcast their transmissions through antennas on a certain frequency. The number of the frequency refers to the number of times that an electromagnetic wave repeats in the span of one second. With sophisticated electronic equipment, these waves can be engineered to carry large amounts of information over great distances.

Intelligent Site Repeater
An Intelligent Site Repeater is a radio site which utilizes a device called a site controller. This controller can perform all call processing and channel assignment tasks that are required to operate the site's base stations. Intelligent Site Repeaters will be utilized in the new NTIC radio network.

Interoperability
This term refers to the capability of separate and independent entities to work together seamlessly. The new NTIC network will promote full interoperability (there are six levels) between all participating agencies. This feature is incorporated in our network as part of the Project 25 standard.

Loading
The FCC awards licenses for frequency usage based on an expectation that there will be a minimum number of users on each channel by a certain time. This amount of users per channel is referred to as loading. For instance, if a wireless network builder purchased licensing for 20 channels from the FCC, then the FCC might stipulate that there must be a certain amount of loading, or users per channel, by a certain time. If the network provider does not meet the loading requirements, their license would be returned to the FCC.

Loading (Cont.)
The FCC does this to provide incentive for carriers to make good use of their purchased frequencies. In the case of a public safety network, the FCC grants channels to government agencies (as opposed to selling them), but still requires a certain amount of loading. When all the channels that have been provided from the FCC cannot handle any additional radio users, the system is referred to as fully loaded.

MDT
An MDT, or Mobile Data Terminal, is a vehicle-mounted keyboard and display that is wirelessly linked to a radio network. An MDT can allow an operator such as a police officer or firefighter to access information from the network, such as missing persons files or driving records. MDT's are primarily used to view information from the network and do not have the capability of operating applications independently from the network.

Mobile
In radio systems, the term mobile is usually used when referring to a vehicle-mounted radio unit. This is different from a portable radio, which refers to a handheld radio.

PTT (Push to Talk)
This term refers to the button on a radio that a user pushes to transmit. When somebody wants to talk over the air, they depress the PTT on their portable radio, mobile radio, or dispatch console, and if there is an available frequency, they will be able to speak over the network. When a user presses the PTT, that is often referred to as "keying" the radio.

PTT (Push to Think)
This term refers to the habit of some radio users who push the button on a radio before they've decided what they want to say, tieing up a channel while they figure it out. Don't do this.

Portable
In radio systems, the term portable usually refers to a handheld radio. This is different from a mobile radio, which would refer to a radio mounted inside a vehicle.

Project 25
Project 25 is a set of guidelines developed by radio system users for the purpose of standardizing the method of designing radio telecommunications networks for public safety agencies. Agencies such as APCO, the Association of Public Safety Communications Officials, the National Association of State Telecommunications Directors (NASTD), the Telecommunications Industry

Project 25 (Cont.)
Association (TIA), the International Association of Chiefs of Police, several federal agencies and radio manufacturers have all participated in building this important standard. Project 25 ensures that all systems following this standard will meet its five main objectives: to make efficient use of the limited number of available public safety frequencies; to permit interoperability among other Project 25-compliant agencies; to ensure backward compatibility of the network; to create smooth system migration via upgrades, additions, etc.; and to provide the capability for scalable trunked and conventional networks.

Queue
When a radio user tries to make a call, and there are no available frequencies to transmit on, that user's call gets placed in a queue. For the most part, the first user that gets placed into a queue will get to transmit as soon as a frequency becomes available, and any subsequent users in the queue will transmit when their turn arrives.

Radio
This term takes on multiple meanings when applied to a communications system. When the term radio is used, it can refer to any of the following: a portable device used to transmit audio, a base station at a transmit site that contains electronic equipment, electromagnetic waves in the air which carry a network's information, or any device used to receive and/or transmit information across a medium.

Repeater
A repeater is a piece of equipment that acts as a transmitter and a receiver. In a radio communications system, repeaters are used to extend the coverage of a wireless transmission. The repeater accomplishes this by first receiving a signal that has been transmitted from some other location, then amplifying and re-transmitting that signal from an antenna, thus giving the original transmission a boost.

Simulcast
A radio network that is simulcast transmits information from each of its transmission sites simultaneously. This means that when a radio user transmits from his/her radio, that transmission is rebroadcast from every tower or antenna that is part of the simulcast system. Because of this technique, any radio can pick up any transmission, regardless of its location.

Site
Also called transmit site, cell site, radio site, or antenna site. Any radio network transmits and receives its signals through antennas that are placed strategically in different locations throughout their desired coverage area. These places are called sites. Usually the antennas at these sites are mounted high above ground on towers or on the sides of buildings. The NTIC network will utilize approximately 12 radio sites across the entire northern tier.

Talkgroup
A talkgroup is a group of radio users that are linked to each other through the trunked portion of the radio system. For instance, if any member of a talkgroup initiates a call, any member of that group will hear that transmission. The NTIC network will incorporate many different talkgroups, and the users in these groups will be able to interact with the members of their own group as well as monitor other talkgroups throughout the network.

Traffic
This term refers to the number of transmissions being made on the network at any given moment. Although most networks are designed to function even when very busy, an excess of traffic on a network may cause some radios to be placed in a queue when trying to transmit. Comprehensive traffic projections will be taken into account while designing the new NTIC network, and since this network provides radio coverage to public safety agencies, the standards have been raised much higher than that of commercial wireless provider.

Trunking
This term refers to a type of communications system that draws from a pool of available frequencies, and assigns them only when they are needed. For example, in the trunked network, when a radio user wishes to talk over the air, they push their transmit button and the system dedicates a frequency to broadcast that user's transmission. After the user lets go of the transmit button, the system can reassign that same frequency to a completely different radio. Trunking is different from a conventional radio network, which assigns one dedicated frequency to a group of radios indefinitely. In a conventional system, if nobody in a particular group is transmitting, their assigned frequency sits unused and is essentially wasted. Trunking can be more efficient, since any available frequency can be used whenever it is needed.

Vocoder
This piece of equipment transforms the sound of a person's voice into a stream of digital information. It also reverses the process converting digital information back to voice. The vocoder is vital to the operation of a digital network, since without it, no audio transmissions could be sent or understood.

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